

REMARKS

Applicants appreciate the Examiner's thorough consideration provided to the present application. Claims 1-6, 11-14 and 16-21 are currently pending in the instant application. Claims 7, 9-10 and 15 have been cancelled without prejudice or disclaimer of the subject matter contained therein. Claims 1, 8, 11 and 16 have been amended. Claims 17-21 have been added for the Examiner's consideration.

The subject matter of additional claims 17-21 is fully supported by the original written description, including, but not limited to, FIG. 4, FIG. 5 and FIG. 6(c) and the corresponding description in the specification. Reconsideration of the present application is earnestly solicited.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-2, 5-6, 8-10, 12-14 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Agate (U.S. Patent No. 79,931). Claims 1-14 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Halleck (U.S. Patent No. 1,401,717). Claims 1-6, 8-14 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Maniscalco (U.S. Patent No. 1,979,975). Claims 8-9 and 12-15 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Walker (U.S. Patent No. 2,530,443). Claims 8-9 and 12-14 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Pfluger et al. (U.S. Patent No. 4,016,929). Claims 1-4 and 6-16 stand rejected under 35

U.S.C. § 102(b) as being anticipated by Harper (U.S. Patent No. 4,642,149). These rejections are respectfully traversed.

In light of the foregoing amendments to the claims, Applicants respectfully submit that all of the rejections have been obviated and/or rendered moot. Since the prior art of record fails to teach or suggest each and every element of the claimed invention, the Examiner's rejections under 35 U.S.C. § 102(b) should be withdrawn.

In contrast to the prior art of record, the claimed invention permits the creation of a series of cross-flow type heat exchangers 50 within a common heat exchanger assembly. The Examiner will appreciate that this controlled isolation of the shell side fluid flow permits a greater control of the individual stages (heat exchangers) created by the isolation and flow direction control plates. For example, the tube side fluid flow can actually be isolated by the claimed invention to include a variety of separate fluid mediums, e.g., a first fluid in a first tube bundle, a distinct, second fluid (liquid or gas) in a subsequent tube bundle, etc.

With respect to independent claim 16, the prior art of record fails to teach or suggest each and every limitation of the unique combination of elements of the claimed invention. Specifically, the prior art of record fails to teach or suggest an isolation and flow direction control plate for controlling fluid flow on a shell side of a shell and tube heat exchanger comprising a base plate; and "a plurality of rectangular fluid slots for permitting a passage of a

shell side fluid flow through the isolation and flow direction control plate. Instead, the alleged isolation and flow direction control plates shown by the prior art of record merely include one fluid slot.”

The following additional comments demonstrate the shortcomings of the Examiner’s rejections based on 35 U.S.C. § 102(b) with respect to each of the above-identified U.S. patents.

Agate (U.S. Patent No. 79,931)

With respect to Agate, and as identified by the Examiner on page 2 of the Office Action, the prior art of record fails to teach or suggest the features of original claim 7. Applicants submit that this feature has been incorporated into claims 1 and 8. Accordingly, this rejection should be withdrawn as the Agate reference fails to teach or suggest each and every limitation of the claimed invention. For example, the Agate reference appears to be directed toward a counterflow type heat exchanger assembly.

Maniscalco (U.S. Patent No. 1,979,975)

With respect to Maniscalco, and as identified by the Examiner on page 2 of the Office Action, the prior art of record fails to teach or suggest the features of original claim 7. Applicants submit that this feature has been incorporated into claims 1 and 8. Accordingly, this rejection should be withdrawn as the Maniscalco reference fails to teach or suggest each and every limitation of the

claimed invention. In addition, the heat exchanging device of Maniscalco fails to teach or suggest the limitations of additional claims 17-19.

Walker (U.S. Patent No. 2,530,443) and Pfluger et al. (U.S. Patent No. 4,016,929)

With respect to Walker and Pfluger et al., and as identified by the Examiner on page 2 of the Office Action, the prior art of record fails to teach or suggest the features of original claim 7. Applicants submit that this feature has been incorporated into claims 1 and 8. Accordingly, this rejection should be withdrawn as neither of these references teaches or suggests each and every limitation of the claimed invention.

Harper (U.S. Patent No. 4,642,149)

With respect to Harper, and as identified by the Examiner on page 2 of the Office Action, the prior art of record fails to teach or suggest the features of original claim 7. Applicants submit that this feature has been incorporated into claims 1 and 8. Accordingly, this rejection should be withdrawn as the Harper reference fails to teach or suggest each and every limitation of the claimed invention.

Halleck (U.S. Patent No. 1,401,717)

With respect to Halleck, the Examiner has alleged that this reference teaches or suggests the limitation of a cross-flow heat exchanger assembly having isolation and flow direction control plates. This interpretation appears improper.

As seen in FIG. 1 and FIG. 3 of Halleck, this heat exchanger device is directed toward a counterflow and parallel flow fluid flow. The shell side flow is parallel to the direction of the tube side flow, either in the same flow direction or directly opposite thereto. Accordingly, the Halleck reference fails to teach or suggest the features of original claim 7. Since this feature has been incorporated into claims 1 and 8, this rejection should be withdrawn.

In accordance with the above discussion of the patents relied upon by the Examiner, Applicants respectfully submit that these documents, either in combination together or standing alone, fail to teach or suggest the invention as is set forth by the claims of the instant application.

Accordingly, reconsideration and withdrawal of the claim rejection are respectfully requested. Moreover, the Applicants respectfully submit that the instant application is in a condition for allowance.

As to the dependent claims, Applicants respectfully submit that these claims are allowable due to their dependence upon an allowable independent claim, as well as for additional limitations provided by these claims.

CONCLUSION

Since the remaining patents cited by the Examiner have not been utilized to reject the claims, but rather to merely show the state-of-the-art, no further comments are necessary with respect thereto.

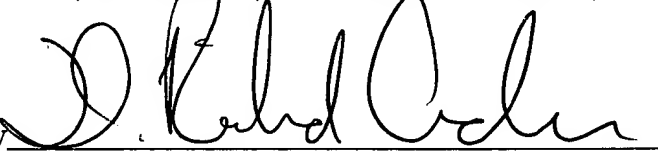
In the event there are any matters remaining in this application, the Examiner is invited to contact Matthew Shanley, Registration No. 47,074 at (703) 205-8000 in the Washington, D.C. area.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

MARKED-UP VERSION OF AMENDMENTS

IN THE CLAIMS

Claims 7, 9-10 and 15 have been cancelled.

Claims 17-21 have been added.

The claims have been amended as follows:

1. (Amended) A heat exchanger assembly comprising:

a shell;

a plurality of tubes;

a shell side fluid inlet;

a shell side fluid outlet;

at least one tube side fluid inlet;

at least one tube side fluid outlet; and

at least one isolation and flow direction control plate positioned normal
to said shell side fluid inlet and in parallel with said tube side fluid inlet in the
shell of the heat exchanger assembly for creating adjacent smaller heat
exchangers, each of said isolation and flow direction control plates including at
least one fluid slot for permitting fluid communication between corresponding
adjacent smaller heat exchangers, wherein said shell side fluid inlet and said
shell side fluid outlet is arranged in a cross flow fluid path with respect to each
of said tube side fluid inlets.

8. (Amended) A method of controlling a fluid flow for a heat exchanger assembly, said heat exchanger assembly including a shell; a plurality of tubes; a shell side fluid inlet; a shell side fluid outlet; at least one tube side fluid inlet; at least one tube side fluid outlet; wherein said shell side fluid inlet and said shell side fluid outlet is arranged in a cross flow fluid path with respect to each of said tube side fluid inlets, said method comprising:

creating a plurality of smaller heat exchangers by providing at least one isolation and flow direction control plate in a shell side of the heat exchanger assembly, wherein each of said isolation and flow direction control plates includes at least one fluid slot for permitting the fluid flow to pass through said isolation and flow direction control plate; and

isolating and directing the fluid flow on the shell side of the heat exchanger assembly between each of said smaller heat exchangers.

11. (Amended) The method according to claim [10] 8, wherein each slot is a rectangular slot.

16. (Amended) An isolation and flow direction control plate for controlling fluid flow on a shell side of a shell and tube heat exchanger comprising:

a base plate; and

[at least one] a plurality of rectangular fluid [slot] slots for permitting a passage of a shell side fluid flow through said isolation and flow direction control plate.